

1 **REMARKS**

2 **Objections to the Specification:**

3 The title of the invention has been objected to because it is not descriptive.
4 The Examiner has suggested a new title. The Applicants have amended the title as
5 suggested by the Examiner.

6 The disclosure has been objected to because in paragraph [0005], line 4, the
7 reference character "102" should be "104" (referring to the scanning device). The
8 Applicants have amended the disclosure to make the appropriate correction as
9 identified by the Examiner.

10 **Rejection of Claims Under 35 U.S.C. § 112:**

11 Claims 21-25 and 31-34 have been rejected under 35 U.S.C. 112, first
12 paragraph, as failing to comply with the written description requirement. The
13 Examiner states that the claims contain subject matter which was not described in
14 the specification in such a way as to reasonably convey to one skilled in the relevant
15 art that the inventors, at the time the application was filed, had possession of the
16 claimed subject matter. The Examiner specifically points out that claim 21 contains
17 the limitation, "solidifying the viscous liquid" and that this limitation is not supported
18 by the originally-filed specification and that this limitation thus constitutes new matter.

19 The Applicants note that to satisfy the written description requirement, an
20 applicant must convey with reasonable clarity to those skilled in the art that, as of the
21 filing date sought, he or she was in possession of the invention, and that the
22 invention, in that context, is whatever is now claimed. (MPEP 2163.01.)

23 In response to the Examiner's contention that the limitation, "solidifying the
24 viscous liquid" is not supported by the originally-filed specification, the Applicants
25 argue that when a method describes building a solid structure from ejected droplets
of liquids (as in the Applicants' disclosure – see ¶ [0012] of Applicants' disclosure),
those of ordinary skill in the art understand that the liquids would ultimately solidify in
order to produce the structure.

Moreover, the Applicants point out that the originally filed specification
provides numerous examples of solidifying liquids used in forming the structure.
Specifically, the Applicants provide, as examples of solidifying liquids, UV setting
resin (paragraph [0021]), thermoplastic resin subjected to heat treatment (paragraph

1 [0021]), and polymerization (paragraph [0023]). Further more, the Applicants explain
2 in paragraph [0024] that liquefied materials can include those that are pre-liquefied
3 by heating and other means, which implies that those materials will solidify
4 when cooled.

5 In view of the above, the Applicants contend that the written description, as of
6 the filing date sought, conveys with reasonable clarity to those skilled in the art that
7 the Applicants were in possession of the invention as currently claimed in claim 21,
8 and that the Applicants therefore have satisfied the written description requirement.

9 Accordingly, the Applicants respectfully request that the rejection of claim 21
10 be withdrawn. Inasmuch as claims 22-25 and 31-34 depend from claim 21, the
11 Applicants also request that the rejections of those claims be withdrawn.

12 Rejection of Claims Under 35 U.S.C. § 103:

13 As indicated in the Office action, all of the pending claims have been rejected
14 under 35 U.S.C. 103(a) as being unpatentable over Ederer in view of various other
15 references including Jang, Fink, Edie, and U.S Patent No. 6,939,489 to Mozner et al.

16 The Applicants note that only claims 1 and 21 are independent claims, while
17 all other pending claims depend from either claim 1 or 21, respectively. Accordingly,
18 the Applicants initially address in detail, herein below, the rejections of claims 1
19 and 21.

20 The Examiner contends that claim 1 is unpatentable over Ederer in
21 combination with Mozner because Ederer teaches a process of making a three-
22 dimensional product as claimed, except that Ederer does not teach first and second
23 different liquefied materials, which is taught by Mozner. The Examiner cites col. 4,
24 lines 5-7, col. 5, lines 44-52, and claim 1 of Mozner. The Examiner appears to
25 contend that the suggestion or motivation to combine the teachings of Ederer with
those of Mozner would have been to manufacture a three-dimensional product from
various materials with a low investment cost.

The Examiner contends that claim 21 is unpatentable over Ederer because
Ederer teaches a process of making a three-dimensional product as claimed, except
that Ederer does not teach solidifying any viscous liquid remaining in the voids,
which would have been obvious to one of ordinary skill in the art at the time the

1 invention was made since at least some small amount of support liquid remains in
2 the voids, which would solidify along with the rest of the three-dimensional object.

3 The Applicants and the Examiner appear to be in agreement as to the
4 applicable legal authority. The Applicants have previously provided specific citations
5 to authority in support of their arguments and will thus not repeat those citations in
6 making the following arguments.

7 **Not All Limitations of Claim 1 are Taught** – The Applicants respectfully
8 disagree with the Examiner's contention that Ederer and Mozner, when combined,
9 teach or suggest all the limitations of claim 1. Specifically, claim 1 requires the
10 following limitation:

11 ejecting drops of first and second different liquefied materials in a
12 pattern and allowing the drops to solidify to form a layer of a three-
13 dimensional object, wherein the second liquefied material is deposited
14 to form portions of the layers which define an external surface of the
15 three-dimensional object.

16 However, contrary to the Examiner's assertion, Mozner does not teach the use of
17 two different liquefied materials (i.e., a first material and a second material) to form
18 the object. Rather, Mozner teaches the use of single material that may consist of
19 two or more components such as a base material and a catalyst material.

20 A thorough search of Mozner reveals that Mozner never refers to the
21 application of more than one material to form the object. Rather, throughout the
22 specification, Mozner refers to application of "a material" and/or "a fluid" to form the
23 object. For example, in the abstract Mozner states "[a] process...includes the step
24 of applying a material." Mozner also states, "[t]he plot nozzle (14) is connected to a
25 tube (20) which receives a fluid (22) from a container (24)." (Mozner Col. 6,
lines 10-11.)

26 The Examiner cites col. 4, lines 5-7 of Mozner as evidence that Mozner
27 teaches or suggests application of first and second different liquefied materials.
28 However, Mozner does not actually teach application of first and second different
29 materials. Rather, what Mozner teaches is application of a single material that can
include two components. Specifically, at the aforementioned place cited by the
Examiner, Mozner states, "...double cartridges are available in connection with two
component materials."

1 Mozner goes on to provide examples of two component materials. For
2 example, Mozner states, “[a] conventional dual hardenable film (Variolink II Base
3 and Cat available from Ivoclar-Vivadent AG) was used ... [and] a mixing container
4 was used which permitted the two components Variolink II Base and Variolink II Cat,
5 to first be mixed in equal portions immediately before the nozzle outlet.” (Mozner,
6 col. 7, line 60 through col. 8, line 3.) Thus, at most, Mozner teaches only the use of
7 a single material having two components. This is not equivalent to the Applicants’
8 limitation requiring application of first and second different liquefied materials.

9 Hypothetically, even if the prior art did teach the use of a first and second
10 different liquefied materials, as is required by the Applicants’ claim 1, the prior art
11 does not teach wherein the second liquefied material is deposited to form portions of
12 the layers which define an external surface of the three-dimensional object, as is
13 also required by claim 1. Moreover, the Examiner does not address this limitation.

14 Thus, the cited prior art references do not teach or suggest all the limitations
15 of claim 1, as is required for obviousness.

16 **No Motivation to Combine Ederer with Mozner** – As the Applicants have
17 previously noted in regard to suggestion or motivation to combine reference
18 teachings, obviousness requires a logical reason apparent from positive, concrete
19 evidence that justifies the combination of the references. The Applicants contend
20 that the Examiner has not provided the requisite positive concrete evidence of a
21 logical reason that justifies the combination of Ederer and Mozner.

22 As mentioned herein above, the Examiner concludes that it would have been
23 obvious to one of ordinary skill in the art to combine the teachings of Ederer with
24 those of Mozner in order to manufacture a three-dimensional product from various
25 materials with a low investment cost. However, there is no evidence to support the
Examiner’s conclusion. Specifically, there is no evidence that the combination of the
teachings of Ederer and Mozner (or even that what was known to one of skill in the
art at the time on the invention) would have been associated with an investment cost
lower than the respective investment costs associated with each of the teachings of
Ederer and Mozner individually.

Thus, there is no suggestion or motivation in the prior art to combine the
reference teachings to result in what is claimed, as is required.

1 **Not All Limitations of Claim 21 are Taught** – The Applicants note that claim 21
2 requires the following limitation:

3 removing the object from the viscous liquid in the vat and then
4 solidifying the viscous liquid remaining in the voids between solidified
5 drops of the material forming the object.

6 The Applicants agree with the Examiner's statement that Ederer does not
7 teach solidifying any viscous liquid remaining in the voids. However, the Examiner
8 does not provide any evidence that this limitation was known to those of ordinary skill
9 in the art at the time the invention was made, as is required. Instead, the Examiner
10 simply states that this limitation would have been obvious to one of ordinary skill in
11 the art at the time the invention was made because some of the liquid remains in the
12 voids and this remaining liquid solidifies along with the rest of the three-dimensional
13 object. However, again, there is no evidence showing that it would have been more
14 obvious to one of ordinary skill in the art to solidify the liquid remaining in the voids
15 as opposed to allowing the liquid to drain away or otherwise removing the liquid from
16 the voids. As is pointed out above, there must be a logical reason apparent from
17 positive, concrete evidence that justifies the modification of the reference. The
18 Examiner has not provided such requisite evidence.

19 Accordingly, the Applicants contend that the prior art does not teach or
20 suggest all the limitations of claim 21, as is required.

21 **Ederer Teaches Away From What is Claimed** – As previously noted, prior art that
22 teaches away is evidence of nonobviousness. A prior art reference may be
23 considered to teach away when a person of ordinary skill, upon reading the
24 reference, would be led in a direction divergent from the path that the Applicants
25 took. (*In re Gurley*, 27 F.3d at 553, 31 USPQ 2d at 1131 (Fed. Cir. 1994).)

Ederer states, "... the supporting fluid is ... selected to remain in its liquid
state throughout the production process" (Ederer, col. 2, lines 54-58, and col. 3,
lines 10-13.) It is apparent that this statement by Ederer teaches away from
solidifying the viscous liquid, as required by claim 21.

Ederer also states, "Preferably, a glycerin solution is used as supporting
liquid" (Ederer, col. 6, lines 33-34.) The Applicants contend that glycerin solution
is not capable of being practically solidified as contemplated by the Examiner. (An

1 85% solution of glycerine (as described by Ederer) has a freezing point of 12.4°F).
2 (See <http://www.dow.com/glycerine/resources/table8.htm>.) Thus, at room
3 temperature (i.e., about 65°F or above), the glycerin solution of Ederer would be a
4 liquid.) Therefore, it is apparent that this statement by Ederer also teaches away
5 from solidifying the viscous liquid, as required by claim 21.

6 Ederer additionally teaches that, "... dents in the surface of the layer produced
7 during the last cycle are ... removed mechanically [by the leveling instrument]"
8 (Ederer, col. 8, lines 1-5.) In other words, according to the teachings of Ederer, the
9 surface of each top layer is smoothed, which prevents any voids from forming within
10 the structure. Thus, according to this teaching of Ederer, solidifying the liquid
11 remaining in the voids would be impossible because there are no voids formed in the
12 structure. This is still further evidence that Ederer teaches away from the limitations
13 required by claim 21.

14 Accordingly because Ederer teaches away, there is strong evidence of the
15 nonobviousness of claim 21.

16 **Claims 2-17, 22-25 and 31-38** – Inasmuch as claims 2-17 depend from claim 1, it is
17 therefore logical that each of claims 2-17 are also not obvious over (or anticipated
18 by) the cited prior art for at least the reasons that claim 1 is not obvious, as set forth
19 herein above. Similarly, inasmuch as claims 22-25 and 31-38 depend from claim 21,
20 it is therefore logical that each of claims 22-25 and 31-38 are also not obvious over
21 (or anticipated by) the cited prior art for at least the reasons that claim 21 is not
22 obvious, as set forth herein above.

23 (Continued on next page.)
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1 **SUMMARY**

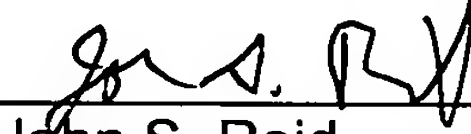
2 In view of the above arguments against the rejections of the pending claims,
3 the Applicants respectfully request that all of the rejections be withdrawn and that all
4 of the pending claims be allowed.

5 The Applicants believe this Response / Amendment constitutes a full and
6 complete reply to the Office action mailed July 16, 2007.

7 If, in the opinion of the Examiner, a telephonic conference would expedite the
8 examination of this matter, the Examiner is invited to call the undersigned attorney at
9 (509) 534 5789.

10 Respectfully submitted,
11 Alfred I-Tsung Pan and
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13 APPLICANTS

14 Date: October 11, 2007

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